

We claim:

- 5
1. A continuously operated process for the intermediate isolation of the oxirane formed by reaction of a hydroperoxide with an organic compound in the oxirane synthesis, wherein the product mixture formed in the synthesis is fractionated in a dividing wall column to give a low-boiling fraction, an
- 10 intermediate-boiling fraction and a high-boiling fraction and the oxirane is taken off in the intermediate-boiling fraction at the side offtake and the hydroperoxide is taken off in the high-boiling fraction at the bottom of the column.
- 15 2. The process as claimed in claim 1, wherein the dividing wall column comprises at least two thermally coupled distillation columns.
3. The process as claimed in claim 1 or 2, wherein the dividing wall column has from 10 to 70 theoretical plates.
- 20 4. The process as claimed in any of claims 1 to 3, wherein the pressure at the top of the dividing wall column is from 0.5 to 5 bar and the distillation temperature at the side offtake is from 10 to 60°C.
- 25 5. The process as claimed in any of claims 1 to 4, wherein the sum of key components in the purified oxirane is less than 5% by weight, with the sum of oxirane and all the other components present in the oxirane being 100% by weight.

6. The process as claimed in any of claims 1 to 5, wherein the product mixture comprising the oxirane is prepared by a process comprising at least the steps (i) to (iii):
- 5 (i) reacting the hydroperoxide with the organic compound to give a product mixture comprising the reacted organic compound and unreacted hydroperoxide,
- (ii) separating the unreacted hydroperoxide from the mixture, as defined in claim 1, resulting from step (i),
- 10 (iii) reacting the hydroperoxide which has been separated off in step (ii) with the organic compound,
- with an isothermal fixed-bed reactor being used in step (i) and an adiabatic fixed-bed reactor being used in step (iii).
- 15 7. The process as claimed in any of claims 1 to 6, wherein the hydroperoxide used is hydrogen peroxide and the organic compound is brought into contact with a heterogeneous catalyst during the reaction.
- 20 8. The process as claimed in claim 7, wherein the heterogeneous catalyst comprises the zeolite TS-1.
9. The process as claimed in any of claims 1 to 8, wherein the organic compound used is propylene and the oxirane is propylene oxide.
- 25 10. An apparatus for carrying out a continuously operated process for the intermediate isolation of the oxirane formed in the oxirane synthesis by reaction of a hydroperoxide with an organic compound, wherein the apparatus for preparing the oxirane comprises at least one isothermal reactor and one
- 30 a adiabatic reactor for carrying out the steps (i) and (iii) as defined in claim 6 and a separation apparatus for the step (ii), where the separation apparatus

comprises a dividing wall column having one or two side offtakes or at least two thermally coupled columns.